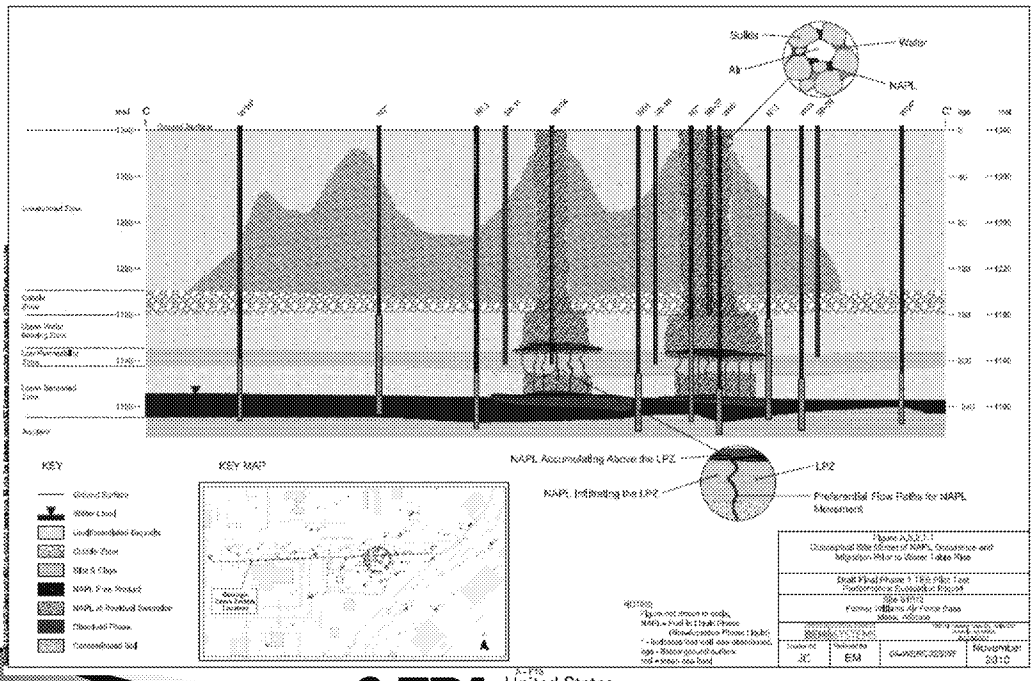
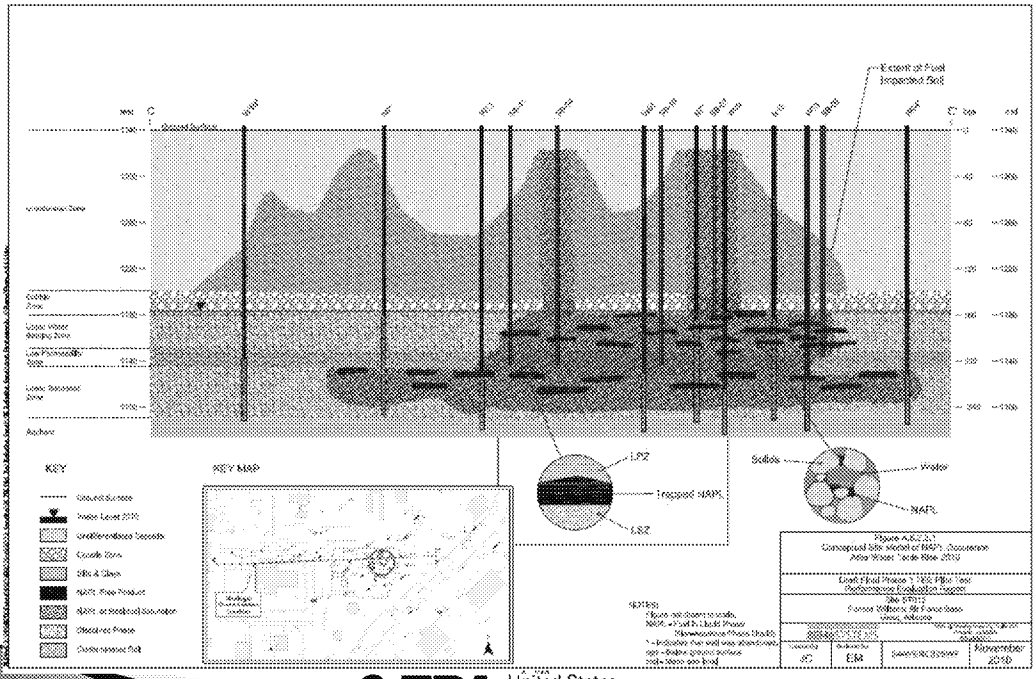
Williams AFB
ST12 Containment Concerns

Fuel Release Area Conceptual Model at maximum depth to water table



United States Environmental Protection Agency

After Water Table rose into Cobble Zone



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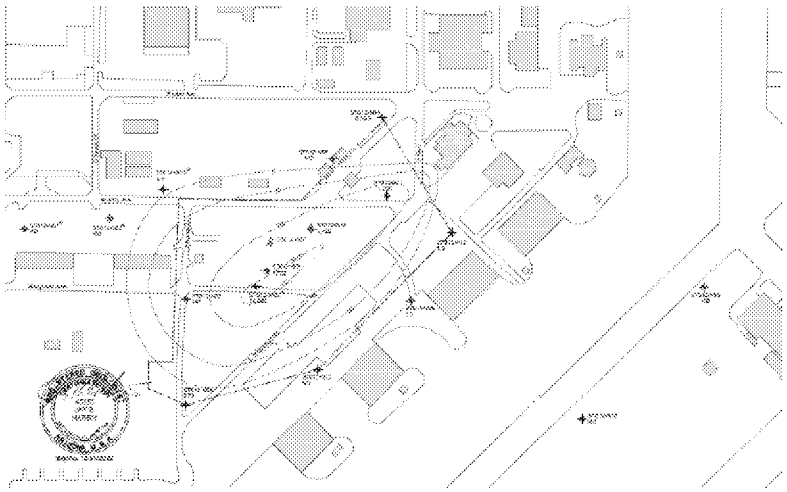
This is dissolved phase benzene before TEE Pilot operation began.
5000 ppb contour is very small area of the site as of Jan 2008 AF has always described the plume as "stable": Did it spread just with the rising water table, or was this an underrepresentation of the actual site conditions?

LSZ Benzene Concentrations Jan 2008



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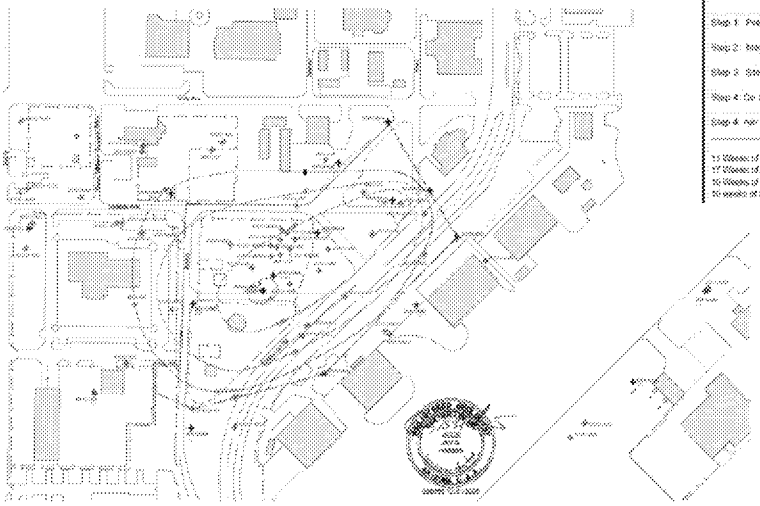
As of Nov 2008 – beginning of steam injection for TEE pilot:

LSZ Benzene Concentrations Nov 2008



Pilot operation schedule:

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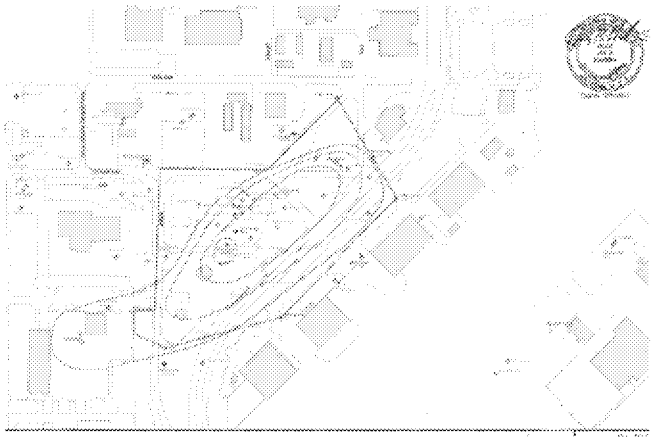
After TEE Pilot – big change in contours

LSZ Benzene Concentrations Nov 2009



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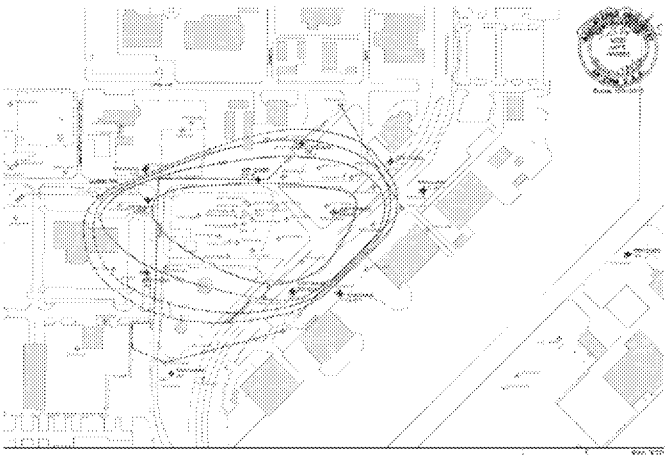
: Loss of containment was a concern during TEE because extraction pumps kept going down and weren't repaired/replaced while pilot was operating; steam injection operating without full containment.

LSZ Benzene Concentrations Nov 2010



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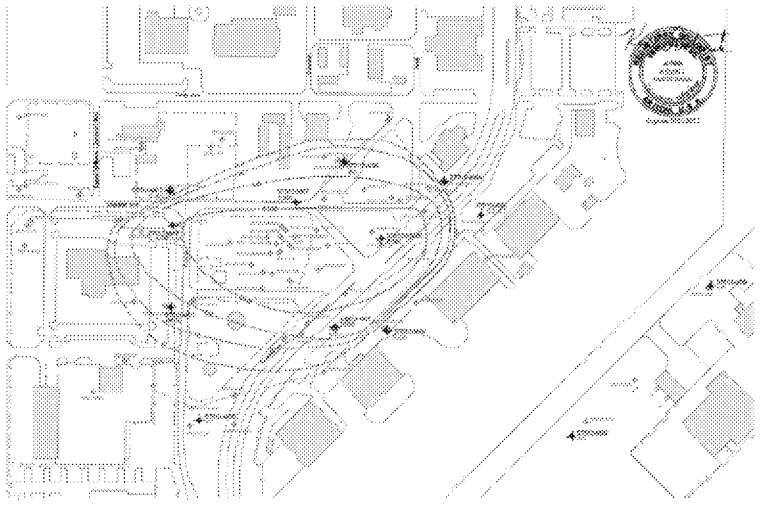
Plume continues to spread now within more highly transmissive Cobble Zone

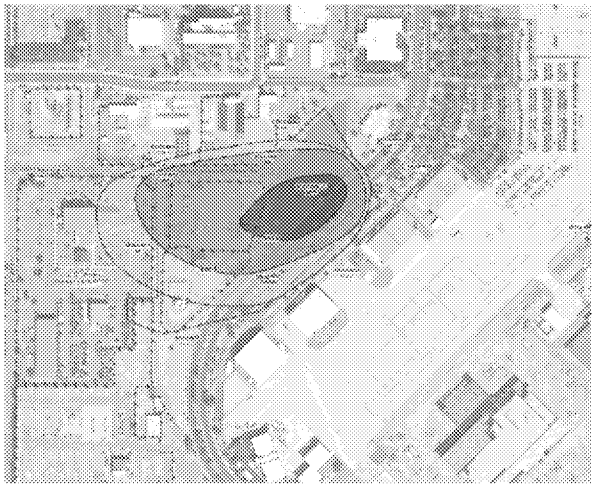
LSZ Benzene Concentrations Nov 2011



Environmental Protection Agency

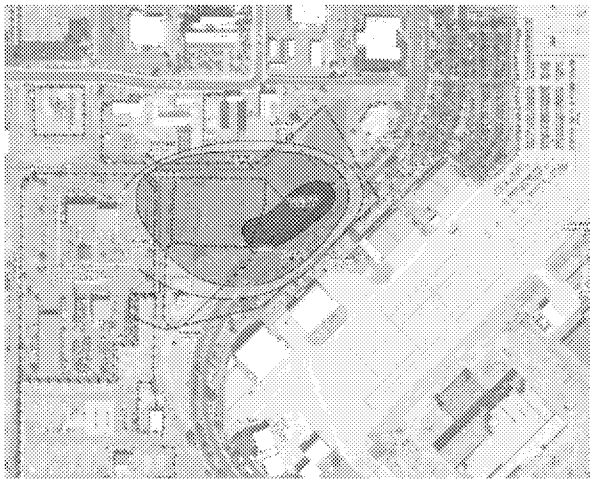
Loss of containment concern acknowleged by AF, as water table now within more transmissive cobble zone. AF implements Containment Study to contain until full scale SEE is implemented
Dissolved plume appears to be moving eastward

LSZ Benzene Concentrations Nov 2012



Dissolved phase Benzene as of RODA Signature: These contours are inconsistent with the figure from the RODA (see next slide): The 5000 ppb contour below is shown in dark pink Why is dissolved phase plume smaller here than in the RODA?

LSZ Benzene Concentrations Nov 2013



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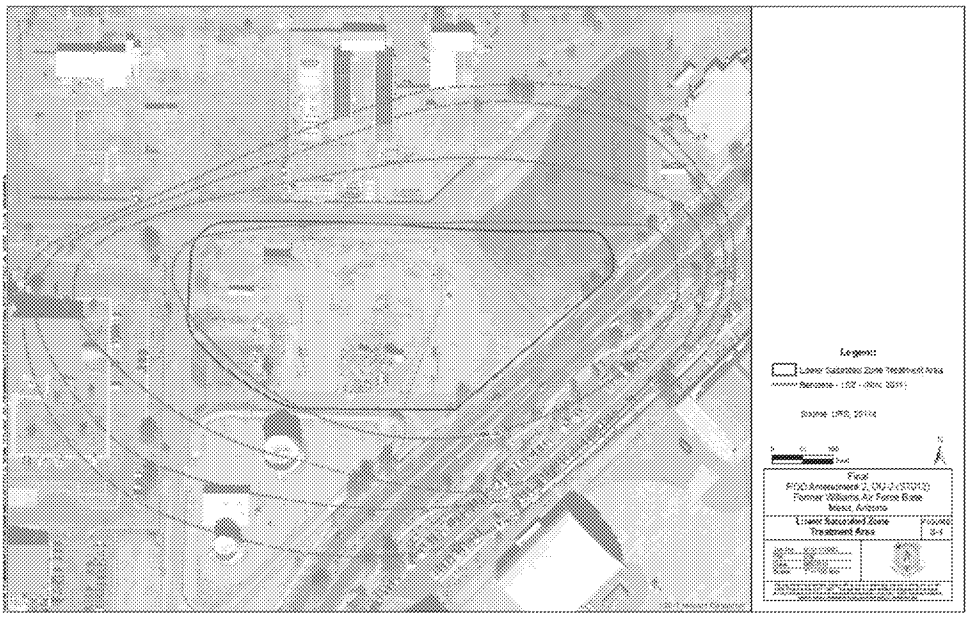
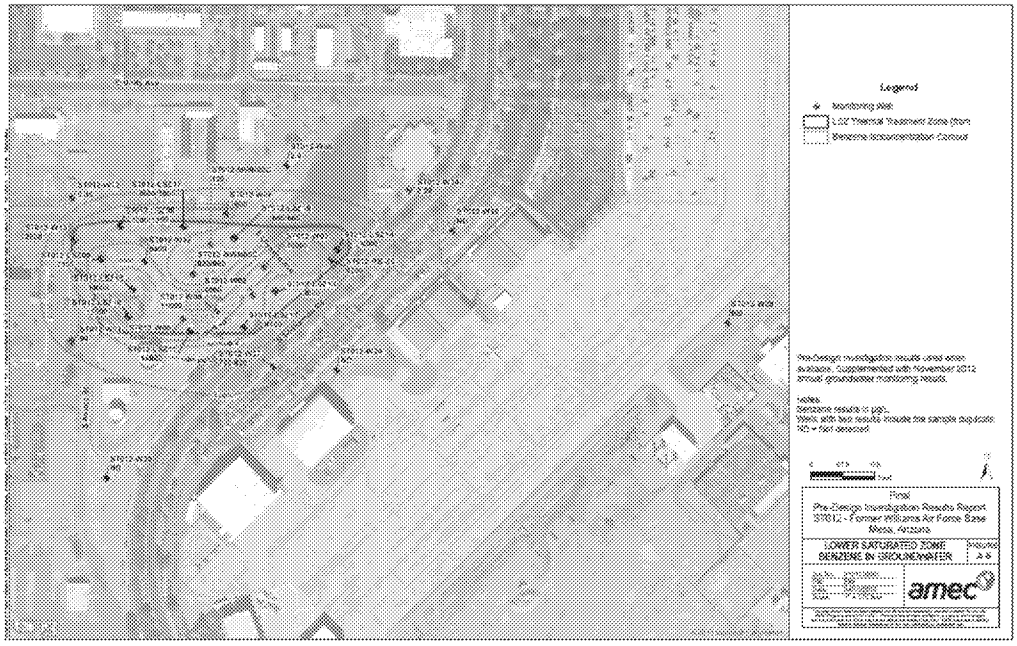
From the 2013 ROD amendment – note the extent of the 5000 ppb contour line



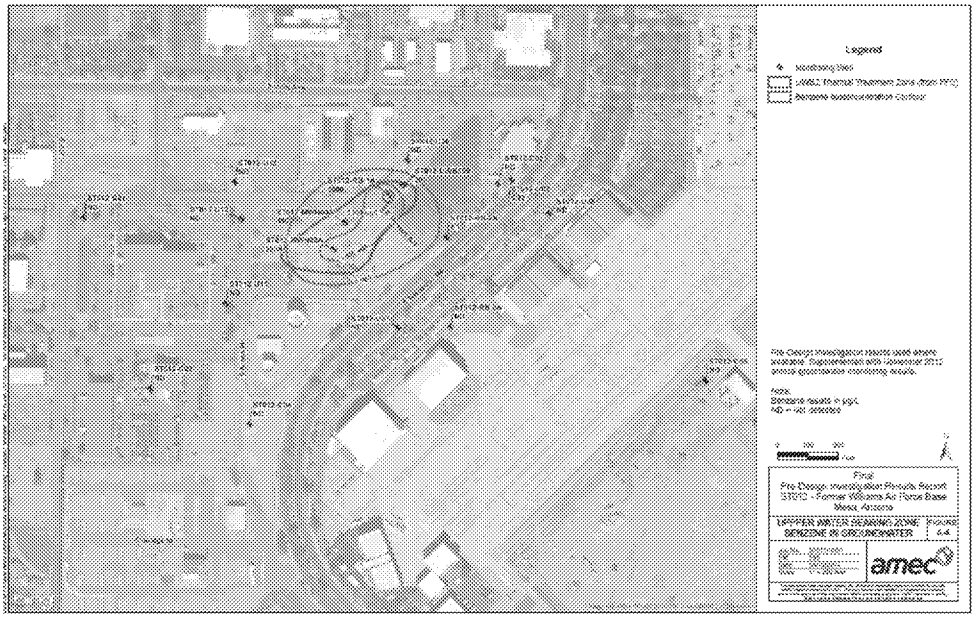
United States Environmental Protection Agency

From the 2014 RDRA workplan: Note concentrations over 10,000 ppb present



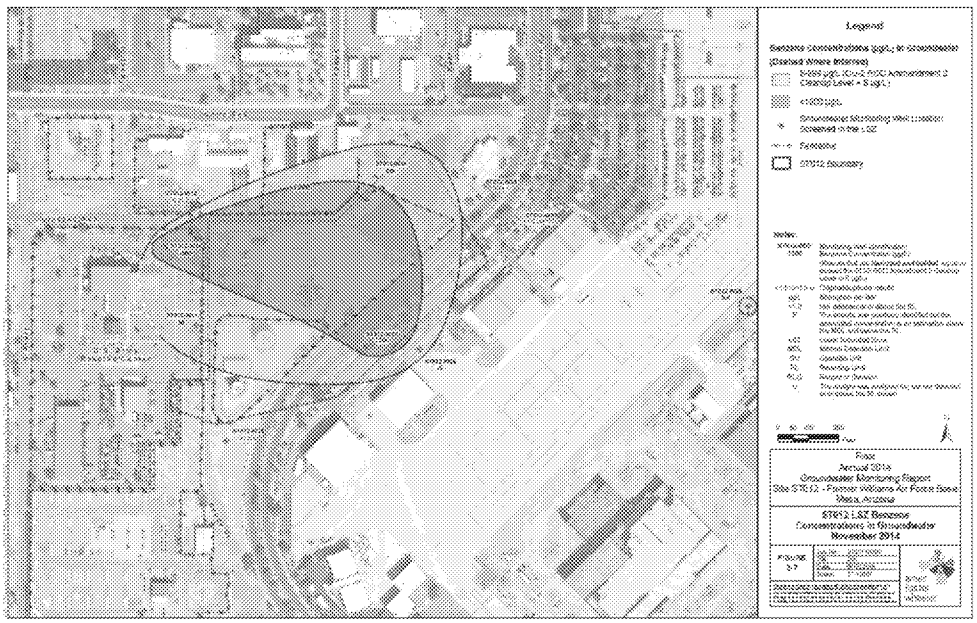
EPA United States Environmental Protection Agency

2014 RD/RA workplan Benzene in Upper Water Bearing Zone



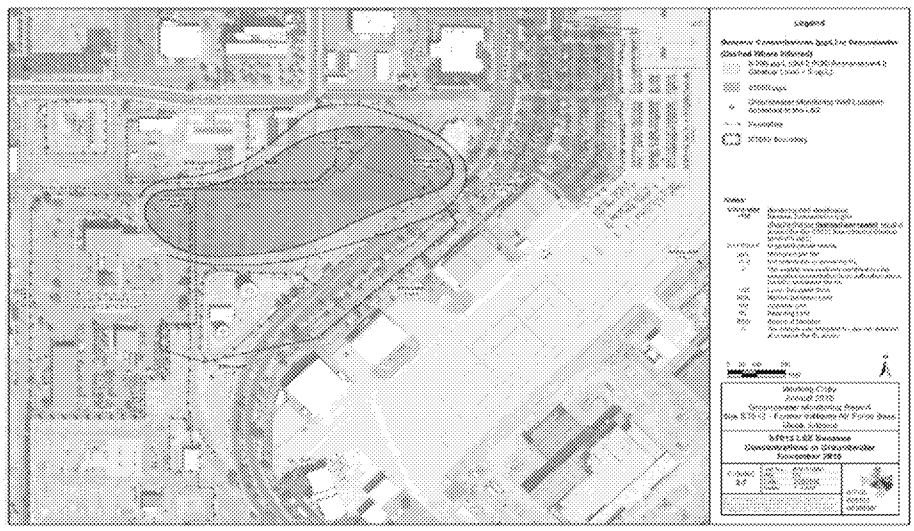
United States Environmental Protection Agency

2014 Annual groundwater monitoring report – November 2014 1 month after initiation of SEE – note where 5000 ppb benzene concentration was is now 1000 ppb benzene concentration. Where did all of the benzene go ? Is it volatilizing?



Why have dissolved benzene concentrations moved north during SEE operations? Is this representation realistic when there is LNAPL documented as present in wells outside of these contours?

LSZ Benzene Concentrations Nov 2015



Agency

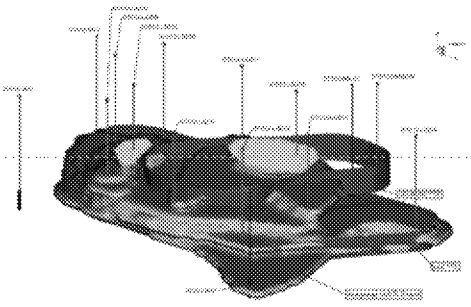
Conclusions & Questions

1. LNAPL and dissolved phase plumes are not stable, but probably moving.
2. Do these figures accurately reflect actual conditions?
3. Focus has been on the LSZ rather than the UWBZ and cobble zone, where contaminants are most likely to be mobilized off site – why isn't Amec presenting the UWBZ/ Cobble Zone data?
4. Could LNAPLor dissolved phase BTEX have been mobilized upward from the LSZ into the UWBZ/ Cobble Zone during thermal treatment?
5. Benzene concentrations between different figures range from over 10000 ppb to less than 5 ppb within the same locations over time, even in areas that were not directly treated with steam. Does this make sense?
6. Why isnt AF/Amec willing to characterize baseline conditions (extent of LNAPL and, benzene concentrations in soil cores post SEE) before initiating EBR?
7. Without knowing baseline conditions, how can milestones be established for meeting the RAO of achieving MCLs within 20 years?
8. If milestones for meeting RAOs cannot be established; do we have grounds already for declaring remedy failure?

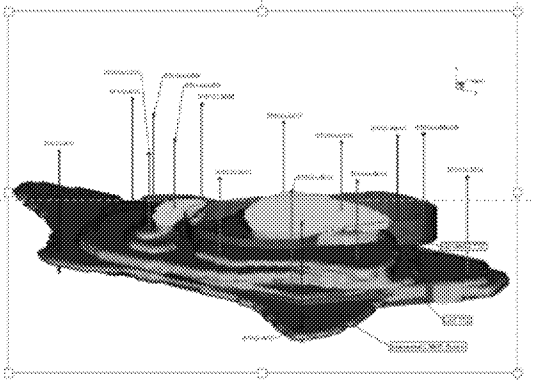
Red bands indicate SEE treatment area in Upper Water Bearing Zone and Cobble Zone

Conceptual model of LNAPL distribution
(view from southeast)

Base Case



Conservative Case



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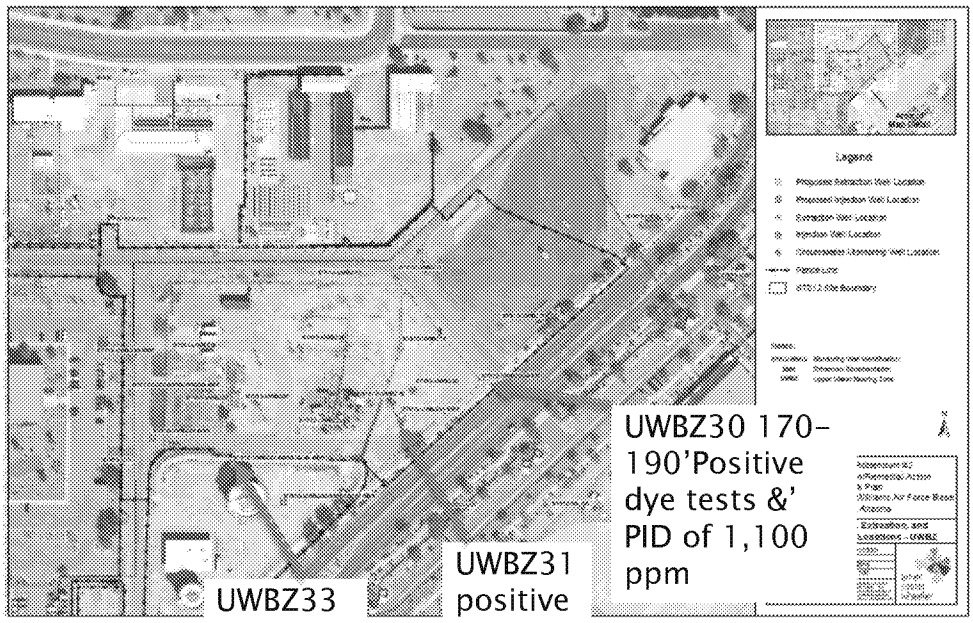
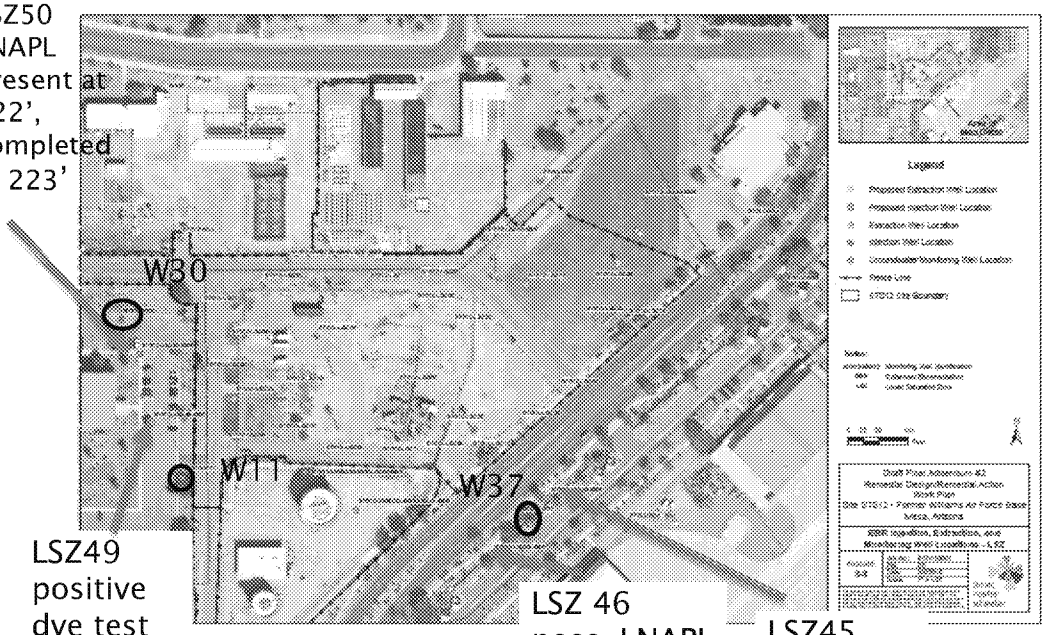
LNAPL in Upper Water Bearing Zone – preliminary reconnaissance data: Had SEE been extended to the roadway, in UWBZ, these would have already been removed. These locations are all accessible to SEE



EPA Environmental Protection Agency

Lower Saturated Zone – Preliminary reconnaissance data: While SEE was operating, LNAPL from these areas was passively recovered in adjacent monitoring wells W37, W30 and W11

LSZ50
LNAPL
present at
222',
completed
at 223'



LSZ49
positive
dye test
216'-228

LSZ 46
poss. LNAPL
@ 210-212'

LSZ45
Positive
dye test
@ 211'

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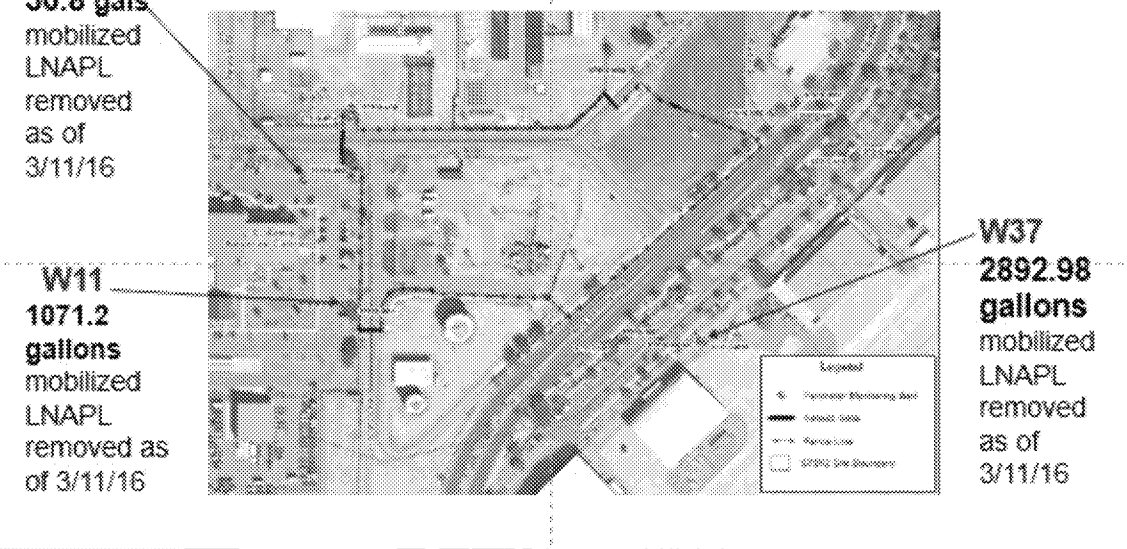
Passive LNAPL Removal during SEE operations in monitoring wells W37, W11, W30 outside of thermal treatment zone – SEE was even treating these areas



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